

Superfund Records Center SITE: Nyanza. - 042

BREAK: 7-6

OTHER: Nobis Engineering, Inc.
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EPA Region 1 RAC 2 Contract No. EP-S1-06-03

January 12, 2009 Nobis Project No. 80022 NH-2358-2010-D

Via Electronic Submittal

U.S. Environmental Protection Agency, Region 1

Attention: Mr. James DiLorenzo, Task Order Project Officer

5 Post Office Square

Boston, Massachusetts 02109

Subiect:

Transmittal of Draft Technical Memorandum for Step Drilling Program

Nyanza Chemical Waste Dump - Operable Unit 2

Remedial Investigation

Task Order No. 0022-RA-RA-0115

Dear Mr. DiLorenzo:

Attached with this correspondence is the Draft Technical Memorandum for Step Drilling Program at Nyanza Chemical Waste Dump – Operable Unit 2.

Should you have any questions or comments, please contact me at (603) 724-6238 or JMcCullough@nobisengineering.com.

Sincerely,

NOBIS ENGINEERING, INC.

Sr. Project Manager

Attachment

c: File 80022/MA (w/enc.)

SDMS DocID

554626



Draft Technical Memorandum for Step Drilling Program

Nyanza Chemical Waste Dump - Operable Unit 2 Ashland, Massachusetts

Remedial Action EPA Task Order No. 0022-RA-RA-0115

REMEDIAL ACTION CONTRACT No. EP-S1-06-03

FOR

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U.S. Environmental Protection Agency Region 1

BY

Nobis Engineering, Inc.

Nobis Project No. 80022 January 2010

U.S. Environmental Protection Agency

Region 1 5 Post Office Square, Sufte 100 Boston, Massachusetts 02109-8912



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Draft Technical Memorandum for Step Drilling Program

Nyanza Chemical Waste Dump - Operable Unit 2 Ashland, Massachusetts Remedial Action EPA Task Order No. 0022-RA-RA-0115

REMEDIAL ACTION CONTRACT No. EP-S1-06-03

For U.S. Environmental Protection Agency Region 1

By Nobis Engineering, Inc.

Nobis Project No. 80022

January 2010

Jeff A. McCullough, P.E. Project Manager

Jeff Brunelle Project Geologist

NH-2358-2010-D

Nobis Engineering, Inc.



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1.0 INTRODUCTION

Nobis Engineering, Inc. (Nobis) was requested by the U.S. Environmental Protection Agency (EPA) to perform a dense non-aqueous phase liquid (DNAPL) assessment via a step drilling exploration program, redevelop and perform hydraulic testing on existing monitoring wells at the Nyanza Superfund Site, located on Megunko Road in Ashland, Massachusetts (the Site). The area of investigation focused on the previously identified bedrock depression located to the southwest of the existing Worcester Air Conditioning (WAC) building located at 148 Pleasant Street, between MW-113A and the Boston and Albany Railroad right of way (ROW). Additional borings were advanced on the other side of the ROW at the Nyacol property located on Megunko Road, in the grassy area between the historical chemical vault and the ROW.

EPA gave an assignment to construct an extraction well system for DNAPL recovery in support of the Explanation of Significant Differences (ESD). This was based on work previously performed for EPA by the Army Corps of Engineers. In order to identify those areas likely to provide the best DNAPL recovery, EPA technical staff recommended an exploratory drilling program to locate potential DNAPL pools near the bedrock/overburden interface.

Nobis was on the Site for a total of 14 days between September 28 and October 15, 2009 to observe and document drilling, soil screening, and soil characterization activities associated with the advancement of soil borings at the Site. Mr. Jeff Brunelle, Project Geologist, was the Field Operations Lead during Nobis' time on site, and Mr. Carl Thunberg, Senior Engineer, was the active Rig Geologist for the duration of the drilling program. Mr. Jason Fopiano, Project Geologist, was on-site on October 30, 2009 to conduct slug testing on two monitoring wells and oversee disposal characterization sampling of investigation derived waste (IDW) generated during the drilling program. In addition, Mr. James DiLorenzo of the Environmental Protection Agency (EPA), Mr. Jeff McCullough, Nobis Senior Project Manager, Mr. Boyd Allen, Nobis Senior Geologist, and Ms. Laura Bonk, Corporate Health and Safety Officer were at the Site on three different days to observe Site activities.

Field activities were conducted in accordance with the Revised Summary of Monitoring Well Sounding Activities and DNAPL Exploration (Work Scope) submitted to EPA via electronic submittal on December 5, 2008.

2.0 STEPPED DRILLING EXPLORATION PROGRAM

Boart Longyear (Boart) was contracted by Nobis to advance soil and rock borings at the Site. The driller used a Minisonic 100c track mounted drill rig to advance 6-inch outer casing with vibratory-sonic methods. Soil samples were collected by advancing a 4-inch soil sample barrel in 5-foot increments, ahead of the 6-inch casing. The extracted soil samples were deposited into dedicated plastic sleeves and presented to the Rig Geologist for soil classification and screening.

Prior to boring advancement at each location, the drill area was grubbed out, and the drill rig and associated casing and drive rods were steam cleaned at a dedicated decontamination pad located in an isolated area of the Site. The driller then wrapped polyethylene sheeting around the rig tracks once the rig was set-up on each boring location. Following completion of each soil boring, the open borehole was filled from the bottom to the surface with a slurry grout using tremie tube methods unless a monitoring well was installed at the boring location.

Five borings were advanced at the WAC property between September 28 and October 7, 2009, and one boring/monitoring well completed. Two borings were advanced on the Nyacol property on October 14 and 15, 2009. Refer to Figure 1 for the locations of borings advanced during the step drilling program. Photographs taken during field activities are included as Attachment A.

Location B-1 was drilled directly south of MW-113A, adjacent to the railroad ROW on the WAC property. This location was as close to the previously identified bedrock depression as permitted by the ROW and the most logical location for residual DNAPL accumulating along the top of bedrock. Sequential boring locations were selected based on soil conditions observed in previously advanced borings and in accordance with the decision tree included in the Work Scope and in consultation with the EPA TOPO. Borings advancement proceeded in the following sequence:

- B-1, located to the south of MW-113A, along the railroad ROW;
- B-2, located 25 feet west of B-1;
- B-3, located between MW11A and B-2, on the east side of the bedrock fracture trace;
- B-4, located 25 feet east of B-1;
- B-5, located between MW11A and B-4 and 20 feet southeast of MW-113A;

- B-6, located approximately 50 feet east-northeast of SB-600, located on the Nyacol property; and
- B-7, located approximately 40 feet northeast of SB-600, located on the Nyacol property.

2.1 Soil Characterization

During soil sample core recovery, the Rig Geologist logged soil descriptions for each sample sleeve retrieved, noting general soil characteristics including soil grain size, color, strata, amount of soil recovered, and other key components used for soil classification. In general, soil conditions observed at the WAC property consisted of a layer of fill at the surface, followed by outwash sand and gravel, lacustrine silty sand, glacial till, and then bedrock. Bedrock was encountered between 38.5 feet and 43 feet below ground surface (bgs) in borings installed at the WAC property and borings were advanced up to 7.5 feet into bedrock at these locations. Soil conditions encountered in the Nyacol property borings were similar to the WAC borings, except significant outwash soil components were not observed in either of the two borings. Borings at the Nyacol property were advanced up to 1.75 feet into bedrock, beginning at approximately 28 feet bgs.

DNAPL-like odors were detected during boring activities in wash water/groundwater from borings B-1 and MW B-5, but no DNAPL was observed in any of the soils or rock cores recovered from borings advanced at the Site. Boring logs depicting soil conditions observed at each boring location are included as Attachment B. Table 1 summarizes subsurface conditions encountered throughout the Site.

2.2 Soil Screening

Nobis screened soil samples for the presence of volatile organic compounds (VOCs) using a Minirae 2000 Photoionization Detector (PID). The Rig Geologist made a small incision lengthwise along the sample sleeve and screened soils with the PID in 6-inch increments along the length of the sample run.

Elevated PID readings detected in borings conducted at the Site ranged from 5.9 parts per million (ppm) in B-6 to 518ppm in B-5/MW. Refer to Attachment B for PID screening results for each boring/interval. No soil samples were collected for laboratory analysis per the Work Scope.

Because of the hazards posed by the Site contaminants, air in the breathing zone was monitored with Draeger tube sample tubes for health and safety reasons whenever PID screening results exceeded 1.0 ppm. During each Draeger tube sampling event, three different sample tubes capable of detecting nitrobenzene, chlorobenzene, and vinyl chloride were processed using a hand-held Draeger tube pump. None of these compounds was detected above health and safety action levels during Draeger tube screening.

2.3 Monitoring Well Installation

Boring B-5 was completed as a monitoring well. Monitoring well construction consisted of sections of two-inch (inside diameter) thread-coupled, stainless steel riser and 0.01-slot well screen installed across the bedrock contact. A 2-foot sump was installed at the base of the well screen to provide a collection point for any DNAPL entering the well. The driller had difficulty recovering rock cores from the bottom of the borehole while advancing boring B-5, and over-drilled the boring during attempted core recovery. No boulders were encountered during drilling. Total boring depth was 48 feet bgs; however, prior to constructing the well, the driller added rock fragments generated during drilling and bentonite chips to seal the bottom of the boring and bring the depth of the hole up to 46 bgs. The 2-foot sump was installed from 46 to 44 feet bgs, and a 5-foot well screen was installed from 44 to 39 feet bgs, across the bedrock contact at 42 feet bgs. Riser was then installed to bring the well up to the ground surface. The annular space between the well screen and boring was filled with clean #00 silica sand, a bentonite seal installed above the sand pack, with a grout slurry installed to within a foot of the ground surface to prevent vertical water migration along the borehole. A flush mounted road box was cemented in place over the well. Refer to Attachment B for well construction details.

3.0 WELL REDEVELOPMENT AND HYDRAULLIC TESTING

From October 8 to 13, 2009, Nobis was on Site to re-develop existing site monitoring wells MW-113A, RW-1, RWS-1, P-1S, P-1B, P-2, P-4, and the newly installed monitoring well MW B-5 (see Table 2).

Well development consisted of mechanical surging with an inertial pump (Waterra foot valve type pump) driven by a small gasoline engine powered vertical lift machine and/or by over-pumping/surging the well using a submersible electric pump (Whale type pump). Wells were

surged/pumped until purge water was visibly clear, or until a significant volume of purge water was removed from the well. Table 2 summarizes the pumping duration and the estimated quantity of water removed from each well during development. Five pressure transducers were also installed in adjacent wells to identify any hydraulic connection between Site bedrock wells based on pumping response. No immediately observable connection between the bedrock wells was identified using the pressure transducers to monitor water level fluctuation in adjacent monitoring wells during inertial pumping and well development.

4.0 WELL HYDRAULIC TESTING

On October 30, 2009, Nobis performed both rising head and falling head slug tests in monitoring wells MW-113A and B-5. Head data were recorded using a pressure transducer and water level meter during the testing.

4.1 Slug Test Procedures

Rising head slug tests were performed by removing a slug of water from the wells with a four-foot long, 2-inch diameter polyethylene bailer and measuring water levels as they returned to static conditions. Following removal of the slug, water levels were recorded over a 30 minute period every second for the first 5 minutes, every 30 seconds for the next 10 minutes, and then every minute for the final 15 minutes. Usable rising head data were not obtained from B-5 because the water levels recovered too quickly (less than ten seconds) for meaningful measurements.

Falling head slug tests were performed in MW-113A and B-5 by adding a known volume of water to the wells (slug) with a funnel and observing water levels fall back to static conditions. The same incremental time steps used for the rising head test were followed for the falling head tests. Because of the rapid aquifer response observed previously in B-5, the recording duration was shortened to 10 minutes with water levels recorded every second for the first 5 minutes, and every 30 seconds for the final 5 minutes.

4.2 Slug Test Results

Water level responses (changes in head) collected during the slug testing were used to estimate hydraulic conductivities of the surrounding formation(s) using standard analytical techniques and were compared to literature values of similar formations for validation.

Rising head data collected from MW-113A were analyzed using the Bouwer-Rice (1976) methodology yielding a calculated hydraulic conductivity of approximately 7.08×10^{-4} centimeters per second (cm/s) or 2 feet per day (ft/d), comparable with literature values for similar aquifers. Falling head data collected from MW-113A were analyzed also using the Bouwer-Rice approach and yielded a calculated hydraulic conductivity of approximately 8.29×10^{-4} cm/s or 2.35 ft/d.

Falling head data collected from B-5 were analyzed via the Bouwer-Rice slug test method and yielded a hydraulic conductivity of approximately 3.31 x 10⁻³ cm/s or 9.39 ft/d.

Additionally, the falling head data were analyzed using the Hvorslev-Full Ellipse (1951) slug testing solution for both wells. Results of the calculations yielded hydraulic conductivities of 7.23×10^{-4} cm/s (2.05 ft/d) and 2.62×10^{-3} cm/s (7.43 ft/d) for MW-113A and B-5, respectively, consistent with the Bouwer-Rice interpretations and literature values.

5.0 INVESTIGATION DERIVED WASTE (IDW)

Throughout the investigation, soil, water, and personal protective equipment (PPE) IDW generated during the drilling and well development activities were collected in 55-gallon drums. When filled, the drums were sealed, labeled, and transported, via flatbed truck, to a dedicated drum storage area at the Nyanza Landfill located on Megunko Road. Drums were stored at the locked landfill inside the existing storage shed and in the former concrete containment area located on the north side of the landfill property. The investigation generated 31 drums: 2 PPE, 19 development water, 8 drill water, and 2 soil drums. Also, a small container (5 gallons) of DNAPL product was generated from previous well gaging activities.

ENPRO Services collected waste characterization samples from the IDW drums and DNAPL product container stored at the landfill on October 30, 2009. Preliminary results indicate that the

IDW will be handled as hazardous waste, and Nobis is currently processing the IDW for off-site disposal.

6.0 SUMMARY AND CONCLUSIONS

Nobis and EPA personnel oversaw drilling and well development activities at the Site for a total of 14 days between September 28, 2009 and October 30, 2009.

Seven borings including one converted into a monitoring well were advanced using a Minisonic drill rig at the WAC and Nyacol properties. The boring program started at B-1 located south of MW-113A and adjacent to the railroad ROW, and proceeded in accordance with the decision tree included in the Work Scope for an additional six borings. Soil conditions observed at the WAC property consisted of fill followed sand and gravel, silty sand, glacial till, and then bedrock. Bedrock was encountered between 38.5 feet and 43 feet bgs in borings installed at the WAC property (B-1 through B-5) and at approximately 28 feet bgs at the Nyacol property (B-6 and B-7). The highest elevated PID readings ranged from 5.9 ppm in B-6 to 518 ppm in B-5/MW. During boring activities, although DNAPL-like odors were detected in wash water/groundwater encountered in borings B-1 and B-5/MW, but DNAPL was not observed in any of the new soil borings advanced at the Site.

During redevelopment of monitoring wells MW-113A, RW-1, RWS-1, P-1S, P-1B, P-2, P-4, and B-5/MW, pressure transducers were installed in surrounding wells to try to identify hydraulic connections between Site bedrock wells. Based on transducer data from adjacent wells, no immediately observable connection between bedrock wells was identified from fluctuating water levels during inertial pumping and well development.

Rising and falling head data collected from MW-113A analyzed using Bouwer-Rice methodology yielded a hydraulic conductivity value of approximately 7.08 x 10⁻⁴ cm/s (2ft/d) and 8.29 x 10⁻⁴ cm/s (2.35 ft/d), respectively.

Falling head data collected from B-5 analyzed using Bouwer-Rice methodology yielded a hydraulic conductivity value of approximately 3.31 x 10⁻³ cm/s (9.39 ft/d), four times that of MW-113A. Rising head data for B-5 were not usable because of the rapid rate of recovery recorded in the well during testing.

Similar values were obtained using the Hvorslev-Full Ellipse (1951) solution on the falling head data and yielded hydraulic conductivities of 7.23×10^{-4} cm/s (2.05 ft/d) and 2.62 x 10^{-3} cm/s (7.43 ft/d) for MW-113A and B-5, respectively.

The investigation generated 31 drums of soil, water, and PPE IDW during Site activities. Based on preliminary results of IDW sampling conducted by the subcontractor, Nobis is currently in the process of identifying hazardous waste disposal facilities for the IDW.

The evaluation of a DNAPL pool in bedrock is a challenging task. DNAPL flow is often characterized by the location, orientation and connectiveness of individual fractures. The absence of an extensive pool of DNAPL suggests B-5/MW is not located in a zone where DNAPL would accumulate. This may be due to interconnectiveness, depth or horizontal position of the well. Another explanation may be that additional time is necessary for the DNAPL to accumulate in the well. It may also suggest that the majority of the DNAPL already has dissipated from the immediate vicinity of the former vault and the bedrock depression area because discharge to the vault ceased approximately four decades ago. The persistent appearance of DNAPL in MW-113A and RW-1 is occasioned when enough DNAPL accumulates and overcomes the entry pressures within the fracture system. When these wells are pumped or sampled, the mass decreases and entry pressure becomes insufficient for further penetration until sufficient mass accumulates again. The limiting factor appears to be the aperture of fractures and the interconnectiveness to any DNAPL pool.

Per the EPA TOPO's direction, an alternate way to find DNAPL using geophysical methods was explored once more. Technical websites were viewed and calls made to several experts. The topic was brought up by EPA's Technical Lead during initial scoping meetings in 2008 and there were no viable technologies at that time. The situation remains the same, 18 months later. All geophysical methods depend on recognizing contrasts – whether it be the difference between material properties like solid vs. liquid phase, physical mass and signal attenuation or geochemical properties like conductivity or resistivity. Although DNAPL and water can be considered to be different phases and can have different densities, there is insufficient contrast for discrimination by available geophysical methods to differentiate between the two materials on top of bedrock or within near surface fractures.

7.0 RECOMMENDATIONS

Based on the results of the step drilling program, DNAPL can be removed from wells MW-113A, RW-1 and potentially at MW B-5 using product pumps with DNAPL level sensors. When enough DNAPL accumulates in the sump, the pump activates, continuing until the low level shut off trips. The time interval between pumping events could range from hours to days depending on the accumulation rates and where the level sensors are set.

Given an assumed DNAPL source to explain the existing dissolved phase groundwater plume, a current summary of contaminant levels in the plume is warranted. The last round of groundwater monitoring and analysis of the OU2 well network (description here) at the Site occurred approximately seven years ago. This sampling data would also support the evaluation if the ongoing vapor mitigation systems currently operating throughout the Town of Ashland and within the existing groundwater plume.

Table 1 Subsurface Conditions Summary Nyanza Chemical Waste Dump - Operable Unit 2 Ashland, Massachusetts

Boring	F	ill	Outwa	sh (SP)	Lacustr	ine (ML)	Т	ill	Bedrock	B.O.B.	GW
Bonnig	from	to	from	to	from	to	from	to	Deulock		5
B-1	0	7	7	25	25	35	35	42.5	42.5	50	10
B-2	0	7	7	28	28	35	35	43	43	48	10
B-3	0	7.5	7.5	23	23	35	35	38.5	38.5	43.5	10
B-4	0	5.5	5.5	18	18	30	30	41	41	41.5	. 10
B-5	0	6.5	6.5	23	23	27	27	42	42	48	4.28
^ В-6	0	17.5	NE	NE	17.5	25	25	27.5	27.5	29	10
B-7	0	18.5	NE	NE	18.5	- 25	25	28	28	29'-9"	10

Notes:

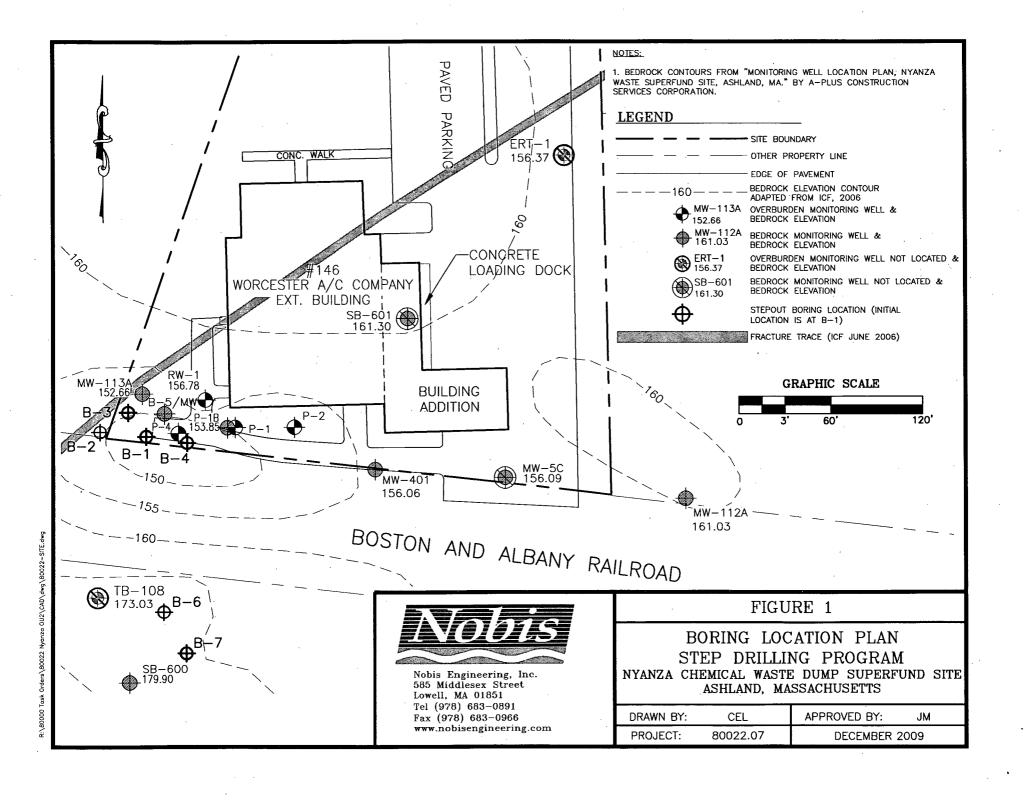
- 1. NE means strata not encountered
- 2. All measurements reflect depth in feet from ground surface existing on the date the explorations were performed.
- 3. Geologic interpretation of strata was determined by the rig geologist while drilling. Other interpretations may be possible.
- 4. Strata transitions were estimated based on bag samples recovered during the roto-sonic drilling process. Strata transitions reflect the rig geologist's best judgment based on less than 100% recovery and on observations of disturbed samples.
- 5. Groundwater observations shown hereon reflect the first observation of saturated soils in the bag samples recovered, except B-5 which shows equilibrated groundwater level readings in the monitoring well installed.
- 6. B.O.B Bottom of Boring
- 7. GW- Groundwater

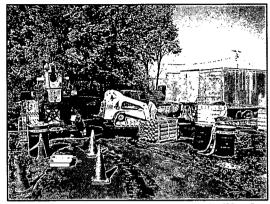
Table 2
Well Redevelopment Summary
Nyanza Chemical Waste Dump - Operable Unit 2
Ashland, Massachusetts

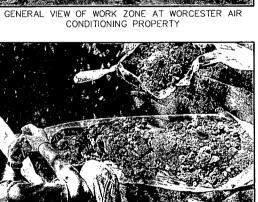
ID	Date Developed	Start Time	Stop Time	Duration (hr:min)	l 1	TOS Depth (ft)	BOS Depth (ft)	As-Built Depth (ft)	Measured Depth - Pre Development (ft)	Measured Depth - Post Development (ft)	Description
MW-113A	10/8/09	11:10	12:20	1:10	55	46	50.5	50.52	53.80	54.35	Water clear, DTB greater than as built depth. Solid bottom feel
MW B-5	10/8/09	12:33	14:32	1:59	110	40	46	46.00	47.20	47.35	Water clear, good flow of water. Solid bottom feel.
RW-1	10/8/09	14:40	15:24	0:44	110	36	51	53.11	41.40	42.65	DNAPL observed, strong odor, elevated PID readings, respirators required.
RWS-1	10/9/09	9:00	10:38	1:38	110	na	na	46.00	32.65	34.47	No silt observed, tan water, gravel in bottom clogging ball valve, pump approximately 2 feet off bottom.
P-1S	10/9/09	10:43	13:00	2:17	, 55	8	18	17.27	16.40	16.60	Low silt observed. Redeveloped with whale pump. Good flow.
P-1B	10/9/09	13:09	15:45	2:36	110	50	53	52.03	41.50	41.70	Good flow, water still silty.
P-1	10/13/09	8:05	9:14	1:09	35	39	42	41.23	19.80	19.98	Tea water, solid bottom feel, good flow.
P-2	10/13/09	12:14	13:35	1:21	20	40.2	43.2	42.33	42.95	42.98	Under trailer, silty brown , low yield, intermittant pumping due to flow. No surging possible.
P-4	10/13/09	9:25	11:58	2:33	275	29.5	32.5	31.83	31.70	32.05	Tea water, solid bottom feel, good flow.

Notes:

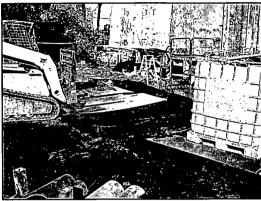
- 1. Measured depths are in feet, measured from the top of the well riser.
- 2. TOS Top of screen interval
- 3. BOS Bottom of screen interval



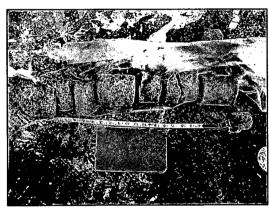




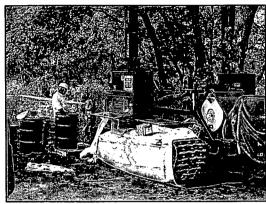
TYPICAL VIEW OF ROTO-SONIC SOIL SAMPLE POLY BAG



DECONTAMINATION PAD



TYPICAL ROCK CORE RECOVERY



BORING LOCATION B-1



BORING LOCATION B-3



Nobis Engineering, Inc. 585 Middlesex St. Lowell. MA 01851 Tel (978) 683-0891 Fax (978) 683-0966 www.nobisengineering.com

FIGURE A-1

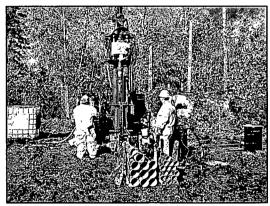
NYANZA CHEMICAL WASTE DUMP SUPERFUND SITE
OPERABLE UNIT 2 REMEDIAL ACTION
STEP DRILLING PROGRAM TO 0022-RA-0115

DRAWN BY:	ML	APPROVED BY:	СТ
PROJECT:	80022.07	DECEMBER 2	009

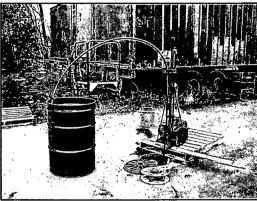
PHOTOGRAPHS TAKEN BY NOBIS ENGINEERING, INC. FROM SEPTEMBER 29 - OCTOBER 15, 2009.



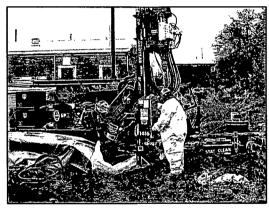
CONSTRUCTING MONITORING WELL AT BORING B-5



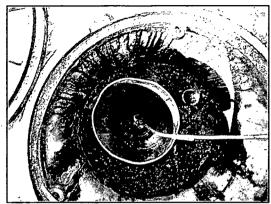
BORING LOCATION B-6 ON NYACOL PROPERTY



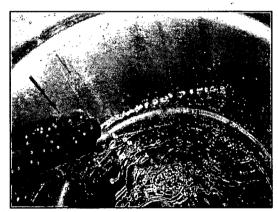
WELL DEVELOPMENT APPARATUS



BORING LOCATION B-7 ON NYACOL PROPERTY



TRANSDUCER INSTALLED IN RW-1, NOTE BENT CASING



DNAPL RECOVERY MW-113A



Nobis Engineering, Inc. 585 Middlesex St. Lowell, MA 01851 Tel (978) 683-0891 Pax (978) 683-0986 www.nobisengineering.com

FIGURE A-2

NYANZA CHEMICAL WASTE DUMP SUPERFUND SITE OPERABLE UNIT 2 REMEDIAL ACTION STEP DRILLING PROGRAM TO 0022-RA-0115

DRAWN BY:	ML	APPROVED BY:	СТ
PROJECT:	80022.07	DECEMBER 2	2009

PHOTOGRAPHS TAKEN BY NOBIS ENGINEERING, INC. FROM SEPTEMBER 29 - OCTOBER 15, 2009.

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1	3				4		#				Massachusetts		Chacl	ked by:	I Dru		
			_		=		_	-						Start: <u>Septen</u>			
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				Boa		/ear		Rig	Type / Mode	el:	BLY Mini-Sonic		Grout	nd Surface Elev	/.;		
ı	Drille	er: <u> </u>		K. F	Regan			_ Han	nmer Type:		N/A	•••••	Тор-с	f-Riser Elev.: ַ			
L	Nob	is Rep).:	С				_ Han	nmer Hoist:		N/A		Datur	n:	NGVD		
ŀ				Drilling M			Samp		Date .	Time	Gro Depth Below Ground (ft.)	undwater (10.49. 0	
L	Тур			Mini-\$	onic	<u> </u>	Poly 8	3ag 	⊋ Date .	711116	10.0	Deput of Ca	ising (it.	Depin to Botton	n of Hole (it.)	Stabilization	. I ime
L	Size	!		4													
L	Adv	ancem	ent	Son	ic					-							
ſ	(ft.)	SA	MPLE	INFORMA	ΓΙΟΝ		و تر	STI	RATUM			SAMPLE D					T SX
	Depth (ft.)	Type & No.	Rec (in.)	Depth (ft)	Blows/ 6 in.	PID	Ground Water	Log	Elev./ Desc.			As Modifie	ed by No	•			REMARKS
١		RS-1	18	0-5	1	1	-	\bowtie		Organic	Soil With Sand, (OL) b	rown, mois	t, Heav	ily rooted fores	t loam		T.
25.67	1						1	\bowtie								,	-
31	2] !												
DECKING PERSON	3						1										
	<u>.</u>				1		1							•			
310002501	4]		-	\bowtie									
3	5						1	\bowtie									
-L		RS-2	40	5-10] .	1		~~~		Silty San	d With Gravel, (SM) 2	0 % gravel,	brown	wet, Dry at tip	of the bag).	-
	6					· ·	-	· C		to coarse	d full length. Upper lay e gravel.	er is thinly	stratifie	d. Lower portio	on contains	20% fine	•
DATA (TO)/BORING	7				-		1	ø									}
					1 .]	0 0									1
TO LEGIS	8			-	-	<u> </u>	┨	5 9									
	9				1 '		1	0			10						1
	40			ļ <u></u>	-	·····	┨	. 0		!	•						1
NA NA	10	RS-3	18	10-15	-	1	Ā	0		Poorly G	raded Sand With Grav	el, (SP) 30	% grav	el, brown, wet			
٦Ľ	11]]	0									
2	12			<u> </u>	-		1	0 ()									}
OKDEKSKOO] .		1	O	,								
쥙-	13						-						•				
N: WOOD	14						1					(
٠.]]	。O	'						4		
2	15	R\$-4	38	15-20	- I	1	1	• C		Poorly G	raded Sand With Grav	el, (SP) 10	% grav	vel, gray, wet. f	Brown to ar	ray at the	
11/24/03	16	-			1		1	Ø		bottom.				, 0 = y,	 91	,	
۱.	,				- !		-	0									
?!	17				.		1	° ()									-
CINCINCERING	18]]	0									
	19			· · · · · · · · · · · · · · · · · · ·	1	-	{	0							,		
8	2] !]	0									
`\	20	A MAIDI M	IDEN	TIFICATION			<u> </u>				 		·				
ì	G	- Ge	oprob	е	<u> </u>	EMARI	NO :			,							
SUMERIO	U	: - Spl ! - Und ! - Cor	distur	bed Sampl	le							•					

	系	$\overline{\mathbb{A}}$			K		_		anza Su	ROJECT perfund Site OU2		ł .	No: Location:		1	
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N	obis	s E	ngine	ering	g, In	C.	- r	Nobis File N	lo:	80022.07		l .		otember 29, 2 ptember 30, 2		
Con	tractor	;	Boar	rt Longy	rear		Rig	Type / Mod	iel:	BLY Mini-Sonic		Grour	nd Surface I	Elev.:		
Drill	er:		K. F	Regan			_ Har	nmer Type:		N/A		Top-o	f-Riser Elev	v.:		
Nob	is Rep	.:	C.	Thunbe	rg		_ Har	nmer Hoist	:	N/A		Datur	n:	NGVE)	
			Drilling M	1ethod		Sampl	ler				oundwater C				با ما د با	
Тур	e		Mini-S	onic	ļ	Poly B	ag	Date	Time	Depth Below Ground (ft.	Depth of Ca	sing (it.	Depth to Bo	ottom of note (it	.) Stabilizati	ion i ir
Size	3		4													
Adv	ancem	ent	Son	ic									 			
£	SA	MPLE	INFORMA	TION		۳. E	ST	RATUM			SAMPLE DI	ESCRIP	TION			\top
Depth (ft.)	Type & No.	Rec (in.)	Depth (ft)	Blows/ 6 in.	PID	Ground Water	ទ្ធ	Elev./ Desc.		(Soil: AS	STM D2488 V As Modifie	isual Ma d by No	anual Procedi bis)	ure		
	RS-5	20	20-25	1	1		, ,						•			
21_	 		-	†) [
22							0									ļ
23				1			• ()									
23]			0									
24							, O								•	
25		-					o ()				·					
26	RS-6	40	25-30	-	1				Sandy S	ilt, (ML) 70 % fines, oli	ve, wet, Thi	nly stra	itified, little	gravel observ	ed.	
			40 25-30 1]		•									
27					-											
28] .												
			· · · · · · · · · · · · · · · · · · ·	-	-											
29	 			-												
30]]			Candi. C	ile /MI \ 2 inches of ail	امديجو حواجها					
31	RS-7	3	30-35		1	1			Sandy S	ilt, (ML) 3 inches of sil	t observed.					
<u></u>				1		1			•							
32			 	-	-	-			,							
33				1												
			ļ									•				
34	 		 	1										V.		
35				1]						. .		,		
36	RS-8	60	35-40	-		-			observe	nd With Gravel, (SM) 3 d. Bedrock estimated a	tines, g at 39.5 feet l	ray, Gl based o	acıar rill. N on drilling. Î	o sig ns of DN No visual or ol	APL Ifactory	
	_			1.					evidence	e of NAPL noted.						
37	-		 	-	ļ							,				
38				1	3.7											
39	-	<u> </u>	 	-	20.4	-										
38	<u> </u>			1												
40	SAMEL	E IDE	ATTEICATIO	N I -					}		<u> </u>					<u> </u>
(G - Ge S - Sp	oprot lit Spo distur	oon bed Samp		28.5 EMAR											

			a				!	Nya		OJECT	U2		1	No:. Location:			
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													1		tember 29, 20		
N	ODIS	s E	ngine	ering	g, In	C.		Nobis File No	o:	80022.07			1		otember 30, 20		
Cor	tractor	r:	Boar	rt Longy	year		_ Rig	g Type / Mode	el:	BLY Mini-So	nic				Elev.:		
			<u>K. F</u>				- 1	mmer Type:				····	1		/ ::		
Nob	ois Rep).:	C					mmer Holst:		N/A			1		NGVD		
Тур			Drilling Mini-S			Samp Poly E		Date	Time	Depth Below Groun		ndwater (epth of Ca			ttom of Hole (ft.)	Stabilization	on Tim
Size			4		-			₹		10.0							
	ancer	\ant	Son		-				<u> </u>								
			INFORMA		1		S	TRATUM	-								- (
Depth (ft.)	Type & No.		Depth (ft)	Blows/ 6 in.	PID	Ground Water	8	Elev./ Desc.		(So	II: ASTI	SAMPLE D VI D2488 V As Modifie	isual Ma	nual Procedu	ure		REMARKS
	RS-9	30	40-42.5		15.9										•		
41		<u></u>		-	<u> </u>												
42				1]				·							
40								i l	Eou for -	ments of pink grar	ito	oros ===!	nad	ntainine =	nyton laladita a :		
43				1	0.7				feldspar.	Bedrock from 42.5	5 feet 1	to 50 feet	. Botton	n of explora	tion at 50 feet	a •.	
44]					odor.	or olfactory evide	nce of	NAPL no	oted. Si	trong "cherr	У"		
45			<u> </u>	}	-	}		1									
46					ļ	ł		ĺ									
47				1													
48																	
40				<u> </u>													
49				-						•							
50				1].											
51				1		1				•					•		
52																	\\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\
53				1		1	.										
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54				1	<u> </u>	1											
55																	
56			<u></u>]		-									
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57	-		ļ	-		1											
58				1													
59		-															
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60 S	SAMPLE	IDEN	ITIFICATIO	N P	EMARI	(S·	L				-						
	3 - Ge S - Sp	oprob lit Spo distur	e oon bed Sampl												·		

	科						-		anza Sur	OJECT perfund Site OU2 Massachusetts	<u> </u>	Boring	No: Location: Se ed by:	e Plan		
N	obis	E	ngine	ering	j, In	c.	-	lobis File N	lo:	80022.07		1	Start: Octo			
Con	ractor		Boar	t Longy	ear		Rig	Type / Mod	lel:	BLY Mini-Sonic		Groun	d Surface Ele	ev.:		
			K. F				1	nmer Type:					f-Riser Elev.:			
			C.		rg		- 1	nmer Hoist:				Datum	n:	NGVD)	
			Drilling M			Sampl	er	Ţ			roundwater					
Тур	3		Mini-So	onic		Poly B	ag	Date	Time	Depth Below Ground (f	t.) Depth of C	asing (ft.)	Depth to Botto	m of Hole (ft.) Stabilizati	ion Ti
Size			4	•				*		10.0						
	ancem	ont	Soni		 											
			INFORMAT		I		ST	RATUM		L	<u></u>				<u> </u>	
Depth (ft.)	Type & No.	Rec (in.)	Depth (ft)	Blows/ 6 in.	PID	Ground	9 S	Elev./ Desc.		(Soil: A			nual Procedure	ı		
	RS-1	38	0-5		0.2		XXX		Sandy O	rganic Soil With Grav	vel, (OL) 5 %	6 gravel	brown, dry,	Fopsoil with	n olive	
1					·] . [brown sil	t observed.						
_			ļ			-	XX								•	
2		_														
3_]			\bowtie									
			<u></u>				XX									
4						-	XXX	,								
5							XX									
	RS-2	60	5-10]	1.3				Sandy O	rganic Soil With Gra	vel, (OL) 5 %	% gravel	brown, dry,	24 inches o	f topsoil.	
6_			1	-		-	XXX				-					
7			· -	1		1										
]			Poorly G	raded Sand With Gra	avel, (SP)				٠.	
8			 	-	ļ <u>.</u>											
9				1		1 1						*				
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10	RS-3	40	10-15		0.7	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\			Poorly G	raded Sand With Sil	t And Grave	ı, (SP-S	M) 20 % grav	el, 40 % sa	nd, 10 %	
11] .			fines, bro	own, wet, Approxima	tely 8 inche	s of silt a	at the top of the	ne bag.		
			ļ	-		4					•					
12			 	1		1				ď						
13]												
				4		-										
14			-	-	<u> </u>	+										
15			<u> </u>	1		1										
	RS-4	50	15-20]	0.9				Poorly G	Graded Sand, (SP) 10) % gravel,	10 % saı	nd, brown, we	*t		
16			 	-		-			!	-						
17	 		-	1		1										
··																
18					ļ	ļ ·								•		
19	-		 	1	-	1							,			
13				1		1										
20]		<u> </u>										
	AMPLE 3 - Ge		NTIFICATION	<u>" </u>	EMAR	KS:									,	
;	5 - Spl	it Sp distu	oon bed Samp	le								•			•	

		Ā			K		-	` Ny:	,	OJECT perfund Site OU2		1		ion: <u>See</u> P			
	\equiv					=				Massachusetts	•	Check	ed by:		J. Brun	elle	
N	obi	s E	ngine	ering	g, In	c.		Nobis File N	lo:	80022.07		Date 9	Start: _	October Octobe	01, 2009	<u> </u>	
Con	itracto	r	Boai	rt Longy	ear/		Rig	Type / Mod	lel:	BLY Mini-Sonic		Groun	d Surfa	ace Elev.:			_
Drill	er:		K. F	Regan			Hai	mmer Type:		N/A		Тор-о	f-Riser	Elev.:			
Nob	is Rep).:	<u>C</u>	Thunbe	erg		_ Hai	mmer Hoist		N/A		Datun	n:		NGVD		
			Drilling M	Method		Samp	ler			,	oundwater (_
Тур	e		Mini-S	onic		Poly B	ag `	Date	Time	Depth Below Ground (ft. 10.0) Depth of Ca	sing (ft.)	Depth	to Bottom o	f Hole (ft.)	Stabilization	n Tin
Size	-		4														_
Adv	ancer	nent	Son	ic					•								
£	SA	MPLE	E INFORMA	TION		2 2	ST	RATUM			SAMPLE D	ESCRIP	TION				19
Depth	Type & No.	Rec (in.)	Depth (ft)	Blows/ 6 in.	PID	Ground Water	<u></u> 69	Elev / Desc.			STM D2488 V As Modifie	isual Ma d by No	nual Probis)				DEMANDE
^4	RS-5	4	20-25		1.1				Poorly G	raded Sand, (SP) 10 %	% sand, bro	wn, wet	, Poor i	recovery		<u>-</u>	
21			1	1													
22_			1]]			,								
23			 			-								*			
23_			1			1		1	•								
24																	
25	<u> </u>		<u> </u>			-											
	RS-6	24	25-30		1				Poorly G	raded Sand, (SP) brov	vn, wet			•			
26	<u> </u>									•							
27				-		-											
]						•							
28			<u> </u>				111		Cita IA/iah	Sand (MAL) 60 0/ fines							
29		<u> </u>	1			1			OHE VAIGH	Sand, (ML) 60 % fines	s, diive brow	m, wet					
											·						
30	RS-7	4	30-35	-	3.5				Silt With	Sand, (ML) olive brow	n wet mos	tly wate	er in the	han Poo	r recover	y No	
31			0000		0.0	<u> </u>			visual or	olfactory evidence of I	NAPL notec	i.	<i>,</i> 117 G1C	, bag. 1 00	1 1000101	y. 140	
	ļ																
32			1	}				;									
33				1	•											•	
٠.			 														
<u>34</u>			1	·		1								•			
35								}									
36	RS-8	50	35-40		16				fines, gra	raded Sand With Silt A sy, wet, Estimating tip of NAPL noted.	And Gravel, of the rock	(SP-SN surface	1) 5 % (at 39.5	gravel, 5 % i feet. No v	% sand, 1 visual or o	0 % olfactorÿ	
									evidence	OF NAFL Hoted.							
37	ļ		 	-		-											
38						1				•							
39		ļ <u>.</u>		1							•					•	
40					28.5												
	AMPLE 3 - Ge		TIFICATION	V RI	EMARI	KS:											
. 5	S - Spi	lit Spo distur	oon bed Sampi	е													

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N	obis	E E	nginee	rino	ı, İn	C.	-	Jobis File N		800	22.07		- Date	Start: _	Octobe	r 01, 200	9	
_												_ `				er 01, 200		.
			Boar		ear				del: :		Vini-Soni V/A	C						_
			K. R		ra		1		·		V/A	ı						_
юр	s Kep.	··	C .		.,		1	T TOISE	·			2roundum	ter Observa			NOVD		_
			Drilling M Mini-So			Sampl Poly Ba		Date	Time	Depth Belo			of Casing (ft.)		o Bottom (of Hole (ft.)	Stabilizat	tio
ype				JIIIC		- QIY DI		₽		1	0.0							
ize			4					ļ						<u> </u>				
dva	ancem	ent	Sani	c														
£	SA	MPLE	INFORMAT	TION		- A	1	RATUM					LE DESCRIP					
Depth	Type & No.	Rec (in.)	Depth (ft)	Blows/ 6 in.	PID	Ground Water	Log	Elev./ Desc.			•	As M	488 Visual Ma odified by No	bis)				
11	RS-9	60	40-45		10.1				Poorly G visual or	raded San olfactory e	d With Sil vidence o	it And Gra of NAPL n	ivel, (SP-SN oted.	4) Simila	ar to prev	ious sam	ple No	
-																		
42																		
43						1 1												
]				from 43 fe			m of explora	ation at	48 feet.			
44_									INO VISUA	ii bi bilacto	y eviden	CE UI NAI	L Hoted.					
45	_																	
-	RS-10	36	45-48] [
46															•			
47				'		-								•				
→ /]]											•	
48																•		
40				-	ļ	4				•								
49				1														
50]												
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60				1	-	1												
	AMPLE	E IDEN	TIFICATIO	N R	EMAR	KS:											-	

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		Į				₹	-	·	Ashland,	Massachusetts		Chec	ked by:	J. Brur	nelle	
N	obis	s E	ngine	ering	g, Iņ	C.	- N	Nobis File	No:	80022.07		1	Start: October Finish: October			
Cor	tracto	r:	Boar	t Longy	/ear		Rig	Type / Mo	del:	BLY Mini-Sonic		Grour	nd Surface Elev.:			
Drill	er:		K. F	Regan		-	_ Han	nmer Type	:			Тор-с	of-Riser Elev.:			
Not	is Rep).:	С	Thunbe	erg		_ Han	nmer Hois	t:	. N/A		1	n:			
			Drilling M	lethod		Samp	ler	D.4	7		oundwater C					
Тур	e 		Mini-S	onic	ļ	Poly E	Bag ————	Date	Time	Depth Below Ground (ft	.) Depth of Ca	ising (it.	Depth to Bottom o	THOIR (II.)	Stabilizatio	<u>in Tir</u>
Size	•		4		<u> </u>											
Adv	ancem	ent	Soni	ic				ļ			 				ļ. <u></u>	
£)		MPLE	INFORMA	TION		7 g	STI	RATUM			SAMPLE D	ESCRIP	TION			
Depth		(in.)	Depth (ft)	Blows/ 6 in.	PID	Ground Water	go y	Elev./ Desc.		•	As Modifie	ed by No	•			0,00
4	RS-1	24	0-5		1				Organic sand and	Soil, (OL) brown black I gravel with roots.	k, moist, Pod	or recov	very 24 inches. T	opsoil/lo	am over	T
1									ļ			•	•			
2							\bowtie									
3					ļ											
							\bowtie						•			ĺ
4			<u> </u>							•		٠				
5			-							•						
<u> </u>	RS-2	48	5-10	1	0.1		\bowtie		Organic	Soil, (OL) brown black	k, moist, 12	inches	of topsoil.			
6			<u></u>		ļ	-	\bowtie									
7		i									,					
							\bowtie									
8									Sandy S	ilt, (ML) 60 % fines, b	rown, wet					
9										·						
40					<u> </u>	_							•			
10	RS-3	38	10-15		0.1	Ϋ́			Poorly G	raded Sand With Gra	vel, (SP) 5 %	% grave	el, 10 % sand, 5 %	% fines, t	orown, wet	
11												_				
12					-											
-12																
13			-													
14																
15	RS-4	48	15-20		0.1		. 0		Poorly G	raded Sand With Gra	vel (SP) 30	% oras	vet brown wet			
16	110-4	70	13-20	}		1	• 0		1 cony C	.acco Cana viidi Gia	+ci, (ci <i>)</i> 50	, v yrav	ici, DiOWII, WEL			
							0									
17			-			1	, O									
18]		1	· C									
10						-	0									
19						1	2									
20				<u> </u>												
	AMPLE 3 - Ge		TIFICATION e	RI RI	EMARI	KS:										
į	5 - Spl	it Spo distur	oon bed Sampl	e									•			

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							'			Massachusetts		Check	ced by:	.I Brur	nelle	
-						_	'					l l	Start: Octo			
N	obis	s Ei	nginee	ering	ı, In	C.		Nobis File N	o:	80022.07		i i	Finish: Oct			
0			Dage	41			Dia	Tune / Med	alı	BLY Mini-Sonic			nd Surface Ele			
			Boar K. R		ear			mmer Type:				- I	f-Riser Elev.:			
			C -		ro		~ I	mmer Hoist:					n:			
-			Drilling M		.,	Samp					oundwater					
Тур	 е		Mini-So		1	Poly B		Date	Time	Depth Below Ground (f	t.) Depth of	Casing (ft.)	Depth to Botto	m of Hole (ft.)	Stabilizatio	n Tim
Size			4		 			— ————	_	10.0						
		ancement Sonic SAMPLE INFORMATION														
					1		67	TRATUM								l un
Depth (ft.)	Type & No.	Rec (in.)	Depth (ft)	Blows/ 6 in.	PID	Ground Water	81	Desc.		(Soil: A	STM D2488	DESCRIP Visual Ma ified by No	anual Procedure			REMARK
	RS-5	60	20-25		0.2				Poorly Gr	aded Sand, (SP) 50 by 14 inches of grave	% sand, br	own, wel	, 18 inches of	poorly grad	ed sand	1
21									ionowed	by 14 mones of grave	a layer ino.	ony mie ç				
22					-	1		ĺ								
								et e e e e e e e e e e e e e e e e e e		·						1
23	ļ					-			Silty San	d, (SM) 40 % fines, o	live brown	wet				
24						-			Only Can	a, (OM) 40 70 mics, 0	mro Brown	, ,,,,,	ř			
]				·						
25	RS-6	60	25-30		0.1	-	****		Silty San	d, (SM) 5 % gravel, 2	25 % fines.	olive bro	wn. wet. Poss	ible glacial t	ill (soil	
26	K3-0	00	25-30		0.1	1			structure	disturbed -angular g	ravel obse	ved)	,,			
]				•						
27					<u>.</u>	-										
21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36											•					
														•		
29	-	-		1		1		-								
30	-	 	 	1	ļ <u>.</u>	1										
	RS-7	0	30-35	1	0.1				No recov	ery.						
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32		 	 .	1		+										
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34				1		1					·					
]												
35	RS-8	21	35-38.5	-	22	-		ļ	Silty San	d, (SM) No evidence	of DNAPI					
36	NO-8	21	30-30.3		- 22	1			Unity Call	a, join, 110 origonoe	. J. D. 1771 L	•				
<u> </u>						1				·					٠	
37	 	ļ		-		-										
2		↓	 	1		4	8898									

Bedrock from 38.5 feet to 43.5 feet. No visual or olfactory evidence of NAPL.

SAMPLE IDENTIFICATION

0 38.5-43.5

REMARKS:

39 RS-9

- G Geoprobe S Split Spoon U Undisturbed Sample R Core Run

	NO Lobis Engine				E				anza Su	COJECT	2		No: Location: <u>See</u> P			
						7			shland,	Massachusetts			ked by:			
N	obis	s E	nginee	ering	j, In	c.		Nobis File N	lo:,	80022.07		1	Start: October	-		
					•								Finish: Octobe			
	tractor		Boar K.F	t Longy	ear		E .			BLY Mini-Sonio N/A		l l	d Surface Elev.:			
					era			mmer Type: mmer Holst				T .	f-Riser Elev.: n:	NGVD		
			Drilling M			Samp					roundwater	1		11015		-
Тур	 е		Mini-So			Poly E		Date	Time	Depth Below Ground (1				f Hole (ft.)	Stabilizati	on Ti
Size	<u></u>		4						1 .	10.0						
Adv	ancem	ent	Soni	ic	 											
(J			INFORMA"	TION	 	ъ.	ST	TRATUM		l	CANADIE)EOODIO	7.01		L	$\neg \tau$
Depth (4	Type & No.	Rec (in.)	Depth (ft)	Blows/ 6 in.	PID	Ground Water	[00]	Elev./ Desc.		(Soil: A	SAMPLE [ASTM D2488 As Modifi	Visual Ma	inual Procedure			
									Bottom o	f exploration at 43.5	feet.					\Box
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Ja				1		1										
60	AMDIE	IDEN	ITIFICATION	<u> </u>		<u> </u>							····			
- (G - Ge	oprob it Spo disturi	e on bed Sampl		EMARI	\ 5:	•			•						

	N	Ŧ/	77					Νυ		OJECT perfund Site OU2	l		o:. ocation: <u>See Plar</u>	B-4		
	7						-			Massachusetts	-	Checked	by:). Brun	elle	
						_	-						rt: October 0			
N	obis	E	ngine	ering	, In	C.	1	Vobis File I	No:	80022.07			sh: October 0			
cont	ractor:		Boar	rt Longy	ear		Rig	Type / Mo	del:	BLY Mini-Sonic			Surface Elev.:			
Prille	er:		K. F	Regan			- Har	nmer Type	:	N/A	*	Top-of-R	iser Elev.:			
Nobi	is Rep.	:	С	Thunbe	rg		_ Har	nmer Hoist	:	N/A		Datum:	1	4GVD		
			Drilling N	lethod		Sampl	er			Gro Depth Below Ground (ft.)	undwater Ob			laia (# \	Ctabilization	on Ti
уре	•		Mini-S	onic	<u></u>	Poly B	ag	Date	Time	Depth Below Ground (R.)	Depth of Casi	ng (it.) Di	epin to Bottom of H	iole (it.)	Stabilizati	וו ווכ
Size			4													
ldva	ancem	ent	Son	ic												
<u>.</u>	SA	MPLE	INFORMA	TION		ъ.	ST	RATUM			SAMPLE DES	CRIPTIC	N.	<u></u>		T
Depth (ft.)	Type & No.	Rec (in.)	Depth (ft)	Blows/ 6 in.	PID	Ground Water	Log	Elev./ Desc.		(Soil: AS	TM D2488 Visi As Modified	ual Manua	al Procedure			
	RS-1	18	0-5		1				Organic S	Soil With Gravel, (OL)	dark brown, i	moist, T	opsoil			П
				-									•			
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2				1		1										
3																
.				-												
<u> </u>		•		1			\bowtie									
;				1] [\bowtie									ļ
	RS-2	60	5-10		11					Soil With Gravel, (OL) d, (SM) 30 % fines, br		moist				
3_			 	d		-			Silty San	u, (Sivi) 30 % lilles, bi	OWII, MOISI					
7				1												- 1
		-		-					Silty San	d With Gravel, (SM) 2	0 % gravel, 1	15 % fine	es, brown, dry			
:]								•		
9				-		•				•					*	
0			ļ		-	-										
	RS-3	16	10-15	1	1.1				Poorly G	raded Sand, (SP) brov	wn, wet, trace	e silt obs	served.			
1				-		1										
2			†	1		1										
3	-		-	-	<u> </u>	-										
14		-		1	<u> </u>	-							i			
·_																
15		00	45.00	-		4			Poorly C	Gravel With Sa	nd (GP) so	% arava	l brown wet			
16	RS-4	60	15-20	-{	1	-	้。ก		F COITY C	AUGEL GLAVEL VIIII) SA	a, (Gr.) 60°	, o grave	, DIOWII, WEL			
U	<u> </u>			_		1										
17]]	Ø		Poorly G	Graded Sand, (SP) 10 '	% sand, brov	vn, wet	•			
. ^				_		-										
18	+	 	1	-		+			Silty Sar	nd, (SM) 60 % fines, o	live brown, w	et, Dilat	ancy quick.			
19]		•								
		ļ		<u> </u>		-										
<u>20</u>		 = IDE	NTIFICATIO	N I	REMAF	KG.	ШШ		1							
(G - Ge S - Sp	oprol lit Sp	oe oon rbed Sami													

No.			Ol						anza Su	ROJECT perfund Site OU2			No: Location: <u>Se</u>		
5		=				7			Ashland,	Massachusetts	· · ·	Check	ed by:	J. Brun	elle
N	lobi	s E	ngine	ering	g, In	C.		Nobis File I	No:	80022.07				ober 05, 2009 tober 05, 200	
Cor	ntracto	r:	Boar	rt Longy	ear_		_ Rig	Type / Mod	del:	BLY Mini-Sonic		Groun	d Surface El	ev.:	
			K. F			·	_ Hai	mmer Type	:	N/A		Top-o	f-Riser Elev.:		
Not	ois Rep	o.:	C	Thunbe	rg		Hai	mmer Hoist	t;	N/A		Datum	n:	NGVD	
			Drilling N	1ethod	Ţ	Samp	ler				oundwater C			· · · · · · · · · · · · · · · · · · ·	
Тур	e		Minl-S	onic		Poly E	Bag	Date	Time	Depth Below Ground (ft.) Depth of Ca	sing (ft.)	Depth to Botto	om of Hole (ft.)	Stabilization Tir
Siz	е		4												
Αdν	anceπ	nent	Son	ic											
(£)	S/	MPLE	INFORMA	TION		2 2	ST	RATUM	.		SAMPLE D	ESCRIP	TION		- 3
Depth (ft.)	Type & No.	Rec (in.)	Depth (ft)	Blows/ 6 in.	PID	Ground Water	Log	Eleví Desc.			STM D2488 V As Modifie	isual Ma ed by Nol	nual Procedure	•	
21	RS-5	60	20-25		2				Silty San	d, (SM) 60 % fines, oli	ve brown, w	vėt			
00			 												·
22						1				•				•	
23						1									
24															
24	1			-		┧									
25]									
26	RS-6	60	25-30	-	4.5	-			Silt, (ML)) 70 % fines, olive brov	vn, wet, Thi	nly strat	ified.		
26	 					┨				••					
27]									
28										•					-
20						1]						
29]		•							
30			-			{									
<u> </u>	RS-7	60	30-35		8.3				Poorly G	raded Sand With Silt, a till. No indication of D	(SP-SM) 5 °	% grave	I, 5 % sand,	10 % fines, w	ret,
31	╁		ļ						Probable	till. No indication of D	NAPL.				
32	-					1									
33	 			-											
34	<u> </u>			1											
35	RS-8	60	35-40		43	-			Poorly G	raded Sand With Silt,	(SD_SNA) 5 9	/- araya	1.5% cand	10 % finos w	unt
36	173-6	00	33-40		43	-			Distinct p	oungent odor, but no vi	isual indicat	ion of N	IAPL.	10 % illies, w	ret,
37	<u> </u>			-											
] -											
38	 			. ;						•					
39						1									
						-									
40 S		IDEN	ITIFICATION	V RI	EMARI	KS:	AXA.				,				
	G - Ge S - Spl	oprob lit Spo distur	e ion bed Sampl				٠.	-	,						

	松	Ž.	Oli		Š				Pi anza Su Ashland,		d Site			Borin	ng Locat	tion: <u>See</u>		-4		
N	obis	E	ngine	ering	ı, In	c.		Nobis File I						Date	Start:	Octob	J. Br er 05, 20 per 05, 2	009		
			Boar					Type / Mo									::			_
			K. F		cai		- 1	mmer Type						-						
			C.		rg		_	mmer Hoist						1	ım:		NGV			
			Drilling M			Samp	oler						undwatei							
ур	9		Mini-S	onic		Poly I	Bag	Date	Time	Depth B	elow G	round (ft.)	Depth of	Casing (f	t.) Depth	to Botton	of Hole (it.) Stabil	lization	<u> </u>
ize			4																	_
dv	anceme	ent	Soni	ic					_						-					_
Œ.	SAI	MPLE	INFORMA	TION		- x	S	FRATUM		.!			SAMPLE	DESCRI	PTION		·			1
Depth (ft.)	Type & No.	Rec (in.)	Depth (ft)	Blows/ 6 in.	PID	Ground Water	[06]	Elev./ Desc.						fled by N	lobis)					
	RS-9	18	40-41.5			-			Poorly C	Graded S	and W	ith Silt, (SP-SM)	5 % grav	/el, 5 %	sand, 10) % fines	, wet		
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<u>59</u>				1																
30 <u></u>	· ·					_														
	AMPLE 3 - Geo		TIFICATIO	N R	EMAR	KS:														
:	S - Soli	t Spo distur	oon bed Samp	le .																

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;									PR	ROJECT		Boring	g No:			B-5			_
		=				I						Boring	g Location:	See !	Plan				_
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=						7		As	shland,	Massachusetts		Chec	ked by:		J. I	Brune	elle		_
							_					1	Start:C						_
N	ODI	s El	ngine	ering	j, in	C.	N	lobis File No	o:	80022.07		1	Finish:	-					
Con	ntracto	г:	Boar	rt Long	/ear		Rio :	Type / Mode	ol·	BLY Mini-Sonic		 	nd Surface						_
			K. F							N/A	 		of-Riser Ele						_
			C		•ra		- 1			N/A N/A		1	n:			VD			_
		 				Samp		inici Fiolot.	-						NG	יאט			_
Тур			Drilling M Mini-S		1	Poly E		Date	Time	Depth Below Ground (ft.	Depth of Ca			ottom	of Hale	e (ft.)	Stabiliza	tion T	ime
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Size	9		4		<u> </u>					4.00	-								-
Adv	ancen	nent	Son	ic				<u> </u>	 	4.28	 		<u> </u>						<u>.</u>
£	SA	MPLE	INFORMA	TION	•	p.	STF	RATUM		SAMPLE DES	CRIPTION				VAIC		TAIL		Ş
Depth (ft.)	Type & No.	Rec (in.)	Depth (ft)	Blows/ 6 in.	PID	Ground	Log	Elev./ Desc.		(Soil: ASTM D2488 Visu As Modified	ual Manual P by Nobis)					VE	IAIL -		REMARKS
	RS-1	34	0-5		1		\bowtie		Organic	Soil With Sand, (OL) o	lark brown,	moist,	Topsoil.	_				\neg	-
1	 	<u> </u>				-							•						
2	-	_	 			1	\bowtie												
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3	<u> </u>	· _				-	\bowtie			•							,	1	
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4	ļ	 	 			Ā				•									
5]					Silt, (ML) 70 % fines, olive brow	wn, wet		•						٠
	RS-2	44	5-10	1	1				Organic	Soil, (OL) dark brown,	wet, Fill.				₩				
6	<u> </u>	-		-		-													
7		-	<u> </u>	1 .		1			Silty Sar	nd, (SM) brown, wet			٠						
]		1			-										
8_	ļ					1			Silty Sar	nd, (SM) brown, dry									
9	 			1		-													
3-				1	-	1				•.									
10]]													
11 12	RS-3	24	10-15	}	1	1			Poorly G	Graded Sand, (SP) 10 '	% sand, bro	own, we	et						
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12]		1								X	M				
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15			ļ	4		1			Б										
40	RS-4	24	15-20	-	1	{	٨٥		Poorly G brown, v	Fraded Sand With Gravet	vel, (SP) 20	% grav	vel,	Image: Control of the con	₩				
16		-	-	1	 	1.	, U		., .										
17]]	0												
							9							Image: Control of the con					
17 18 19	-		ļ	-	<u> </u>	-) U												
19	-	-		-		-	0										nent		
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20				<u> </u>]	, · · ·		·					\mathbb{M}	M				
	SAMPLE G - Ge		TIFICATION	R	EMAR	KS:													
	S-Sp	lit Spo	on																
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N	obis	s Ei	nginee	ering	ı, In	C.	-	Nobis File	No:	80022.07			October 05 October 0		
on	ractor	:	Boar	t Longy	ear					BLY Mini-Sonic	G	round Sur	face Elev.:		
			K. R				1		ə:		Т	op-o f -Rise	r Elev.:		
ob	s Rep	.:	C.		rg		- Han	nmer Hois	t:	. N/A			· N	IGVD	_
		_	Drilling M			Sampl		Date	Time	Gro Depth Below Ground (ft.	Oundwater Obs			ole (ft) Stabilizat	
ype			Mini-So	onic	-	Poly B	ag 	2		Dopar Bolon Ground (K.	A Dopar or Odom	9 (70) 200	110 2010111 0171	Jio (iii) Gudhiileac	
ze			4		ļ				-	4.28			 -		
dv:	ancem	ent	Soni	С	<u></u>					4.20					
	SA	MPLE	INFORMAT		خند	fe ja		RATUM	_	SAMPLE DES		4	w	ELL DETAIL	
radian (in)	Type & No.	Rec (in.)	Depth (ft)	Blows/ 6 in.	PID	Ground Water	Log	Eley/ Desc.		(Soil: ASTM D2488 Visu As Modified	by Nobis)				
	RS-5	48	20-25.		1		, ,		Poorly C brown, v	Graded Sand With Grav	/el, (SP) 20 % ·	gravel,		3	
1_) <u> </u>							3	
							, o							3 .	
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_) Ø								
							, 0							Á	
5			 	ŀ					Silt, (ML	.) 60 % fines, olive brow	wn, wet, Stratif	ed.		3	
	RS-6	48	25-30		1]			Silt, (ML	.) 60 % fines, olive brow	wn, wet				
)									Poorly 0	Graded Sand With Silt,	(SP-SM) 10 %	fines,			
<u>, </u>									brown, v	wet				3	
3														3	
														3	
9_			<u> </u>			-					ě			8	
)				}										\$	
	RS-7	30	30-35		12				Poorly (Graded Sand, (SP) bro	wn, wet			3	
<u> </u>															
2_						1		•						Ä	
2				-		-				·				3	
3_]]								\$	
4_			-			-									
5				1		1								3	
	RS-8	60	35-40		1	-			Poorly (Graded Sand With Silt, wet, Glacial till. No visu	(SP-SM) 10 %	fines, evidence o			
6				-		-			NAPL n		an or ompotory	011401100		Bentonite	
7														seal	
0				-		-			ļ						
8				1						•				2 in.	
9]] .								steel slotted	đ
)				-		-								encased in	I
_	AMPLE	IDEN	ITIFICATION	N R	EMAR	К С [,]	WAG.						<u></u>	filter sand.	_

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				7	, ,			٠.	PF	ROJEC	T		Boring	9 No:	. B-	5	
	e	=	<i>7</i> 37			3	'						Boring	Location	: See Plan		
	ZS	V			2		-				Site OU2						
		₹				7	-	A	sniand,	Massac	nusetts		Check	ked by: _	J. Bn	inelle	
1	lohi	s F	ngine	erino	ı İn	~	-						Date	Start:(October 05, 20	09	
L				· · · · · · ·	,	<u>. </u>	N	obis File N	o:	80	022.07		Date	Finish:	October 06, 20	009	
Co	ntracto	r:	Boa	rt Longy	ear/	;	Rig	Type / Mod	el:	BLY	Mini-Sonic	•	Grour	nd Surface	Elev.:		
Dri	ller:	-	K. F	Regan			_ Ham	mer Type:		•	N/A		Top-o	f-Riser Ele	ev.:		
No	bis Rep	o.:	С	Thunbe	rg			mer Hoist:			N/A		1	n:			
			Drilling N	lethod	,	Samp	er					undwater (······································		
Ту	pe		Mini-S	onic	ŀ	Poly B	ag	Date	Time	Depth Bel	ow Ground (ft.)	Depth of C	asing (ft.)	Depth to E	Bottom of Hole (ft	.) Stabiliza	ation Tim
Siz	:e		4					*		 							
hA	vancen	nent	Son	ic.					1	4	1.28						
-	1		INFORMA				STR	ZATUM							· · · · · ·		- 1
Depth (ff.)	Туре		Depth	Blows/	PID	Ground Water				(Soil: AST	SAMPLE DES M D2488 Visu	CRIPTION al Manual P	rocedure		WELL	DETAIL	REMARKS
å		(in.)		6 in.		ຫ້≶	ę P	Elev./ Desc.			As Modified b	oy Nobis)					REN
١	RS-9	24	40-43		518						id With Silt, (pungent odo						
3 41	┼─		 						No visua of NAPL	l evidence			,	onigo.			N.
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43	RS-10	60	43-47														
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∑ }	S - Spl	lit Spo	on														
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		Ŧ.										Boring	Location: See Plan	··
1						I	-			perfund Site OU2		·		
	abla					7	-	A	shland,	Massachusetts		ł	ked by: J. Br	
A	obi	. E	ngine	rino	, In	<u> </u>	-				<u>.</u>	Date :	Start: October 14, 20	009
′ ′	UDI	o	igiriet	<i>,,,,</i> ,,	,	U.		lobis File N	lo:	80022.07		Date I	Finish: October 14, 2	009
Cor	tracto	r:	Boar	t Longy	ear		Rig	Type / Mod	lel:	BLY Mini-Sonic		Grour	nd Surface Elev.:	
Drill	er:		· К. Б	Regan			_ Harr	mer Type:		N/A		Top-o	f-Riser Elev.:	· · · · · · · · · · · · · · · · · · ·
Nob	is Rep).:	c	Thunbe	rg		_ Harr	mer Hoist:		N/A		Datun	n: NGV	D
			Drilling M	lethod		Samp	ler				undwater (
Тур	е		Mini-S	onic		Poly E	Bag	Date	Time	Depth Below Ground (ft.) 10.0	Depth of Ca	ising (ft.)	Depth to Bottom of Hole (1	t.) Stabilization Tim
Size	;		4							10.0				
Adv	anceir	nent	Soni	ic	<u> </u>									
<u> </u>			INFORMAT		1	Ī_	STI	RATUM			CAME: E =		TION	1 9
Depth (ft.)	Туре	Rec	Depth	Blows/	PID	Ground	60	Elev / Desc.		(Soil: AS		isual Ma	anual Procedure	NO AD
6	& No.	(in.)	(ft)	6 ln.		(O >		ďδ		0.1114816.0	As Modifie			1
	RS-1	36	0-5		1		XX		Organic :	Soil With Sand, (OL) 1	z inches of	iopso	п. ,	
		·			-	1	\bowtie		Silty San	d, (SM) moist, Fill				
2						1	\bowtie			•				'
		_				-			Silty San	id, (SM) dark brown bla	ck, wet, tr	ace gra	vel observed.	
3	-	<u> </u>	· · ·			1	\bowtie							
4						1								
						1								
5_	RS-2	22	5-10		. 1	-			Silty San	nd, (SM) dark brown bla	ack, wet			
6	173-2	- 22	J-10	.		1			J 001	, () addit brotti bic				
Ť]]	\bowtie							
7						-								
, p		-				1	\bowtie	ļ						
۲]							-			
9]		•				
40	-	-		-		_	\bowtie			•				
ا''	RS-3	.18	10-15	1	1	- \ \(\bar{\Lambda}{\tilde{\Lambda}}\)	\bowtie		Poorly G	Graded Sand, (SP) 10 %	% sand, da	rk brow	n, wet, trace silt observe	ed.
11]	\bowtie							<u> </u> .
40	-	ļ		-		-	\bowtie							
12	 			1		1								
13]										
			<u> </u>			4					•			
14	-			1	5.9	-								
15		<u> </u>	<u> </u>		<u> </u>	1.					,			
	RS-4	60	15-20]	1]			Poorly G	Graded Sand, (SP) 10 %	% sand, da	rk brow	n, wet	
16	 		<u> </u>	-		-					٠			
17		 		1		1								
Ë				1		1								-
18				1		-	\prod		Silt, (ML) 60 % fines, olive brow bottom of fill depth at 1	wn, wet, St 17.5 ft	ratified.	Aprubt transition from s	sand to silt.
1				-		-			moned	octon of an dopurat	, , , , , , , , , , , , , , , , , , , ,			
1 2 3 4 5 6 7 8 8 9 10 10 11 12 12 15 16 16 17 17 18 19 19 20 3 16 16 17 17 18 19 19 19 19 19 19 19 19 19 19 19 19 19	-			1		1		.						
20				1		1								
₹	SAMPLI	E IDEN	TIFICATION	N R	EMAR	KS:								

G - Geoprobe S - Split Spoon U - Undisturbed Sample R - Core Run

		10	b	i I£				nza Su	ROJECT perfund Site C			Boring	No: Location: <u>Sec</u>	e Plan	6	
					7		A	shland,	Massachusett	ts		ĺ	ed by:		·	
N	obis	Engir	eerir	ng, In	C.		Nobis File No	DI	80022.07				Start: Octo			
Cor	tractor:		Boart Lor	gyear		_ Ri	g Type / Mode	el:	BLY Mini-Sc	onic		Grour	d Surface Ele	v.:		
		***				_ Ha	ımmer Type:		N/A			Тор-о	f-Riser Elev.:			
Not	is Rep.;		C Thun	berg		_ Ha	ımmer Hoist:		N/A			Datun	າ:	NGVE)	
		Drillir	ng Metho	d	Samp	ler		1			undwater					
Тур	e 	Mi	ni-Sonic		Poly E	Bag	Date ▼	Time	Depth Below Grou 10.0	nd (ft.)	Depth of C	asing (ft.)	Depth to Bottor	n of Hole (ft	.) Stabilization	ı Tim
Size	;		4													
Adv	ancemer	ıt	Sonic								•					
£	SAM	PLE INFOR	MATION		P k	S	TRATUM	<u> </u>	 		SAMPLE [ESCRIP	TION		<u></u>	2
Depth (ft.)		ec Dep n.) (ft)	th Blow 6 in		Ground	fool	Elev./ Desc.		· (\$	oil: AS		/isual Ma	nual Procedure			REMARKS
	RS-5	0 20-2	25	11	_			Liquified	silt turned to liqui	d mu	d. No reco	very.		· · · · · · · · · · · · · · · · · · ·		T
21			_	<u> </u>	-											1
22					_		'									
	-			-	-								٠			
23					1											
24]											
25					4											
25	RS-6 2	24 25-2	29	1	1			Poorly G	raded Sand With	Silt, (SP-SM) 10	% fine:	s, gray, wet No	visual or	olfactory	
26								evidence	of NAPL noted.						,	
27				·	4											
27																
28								Approxin	nately 6 inches of I or olfactory evid	rock	core recov	ered. Bo	edrock type is	granite.		
29					-				i or ondectory evid	CHOC	0/14/4 21/	otea.				
						222										
30					_										•	
31					-											
32			-		-											
33													•			
		_											•			
34				-	-											ŀ
35									•							
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36		_			-											
37									•							
20					-											
38					+											
39					_											
40	-	_			4		, [
40 S	AMPLE II	ENTIFICA	TION T	REMAR	KS:	11			<u>, , — — — — — — — — — — — — — — — — — —</u>						-	1_
;	G - Geop G - Split S J - Undis R - Core	Spoon turbed Sa	ımple	٠												

	系								anza Suj	POJECT Derfund Site OU2		1	•	ion: <u>See Plan</u>	3-7	
=	\equiv	=				₹		<i>F</i>	Ashland,	Massachusetts		Check	ed by:	J. B	runelle	
N	obis	s E	ngine	ering	j, In	c.		Nobis File N	No:	80022.07		1	_	October 15, 2 October 15, 2		
Cor	tractor		Boar	t I onav	ear		Rio	Type / Mod	del·	BLY Mini-Sonic				ace Elev.:		
			K. F		<u>Cai</u>			mmer Type				1		Elev.:		
			C.		ra .			mmer Hoist				1		NG\		
			Drilling N			Samp					oundwater	.1				
Тур	е		Mini-S		1	Poly E		Date	Time	Depth Below Ground (ft.				to Bottom of Hole	(ft.) Stabilization	on Tim
Size			4		 			 ₹		10.0						
	ancem	ent	Soni	ic	-			_								
			INFORMAT			1	ST	RATUM					l		1	Τ,
Depth (ft.)	Туре	Rec	Depth	Blows/	PID	Ground				(Soil: AS	SAMPLE (STM D2488 Y	/isual Ma	inual Pre	ocedure		REMARKS
Ğ	& No.	(in.)	(ft)	6 in.		Q≥	2	Elev./ Desc.			As Modifi	ed by No	bis)			Æ
	RS-1	36	0-5	;	1	┨			Organic	Soil With Sand, (OL) 1	Topsoil	•				
1	 	-				1			Poorly G	raded Sand With Silt,	(SP-SM)					
2]		1			-							
_	<u> </u>		ļ		- 50	-		}	Poorly G observed	raded Sand With Grav I.	vel, (SP) da	rk brow	n black	k, moist, Distinct	odor	
3					50	1										
4]										
						-										
5	RS-2	60	5-10		157	1			Poorly G	raded Sand With Grav	vel, (SP) gr	ay, mois	st			
6					107											.,
_						-										
7	-															
8					15				Poorly G	raded Sand, (SP) 10	% gravel, 1	0 % sar	id, darl	k brown, moist, i	Bottom 18	
			ļ			4			inches. t	Exhibit sewage odor.						
9	-		-			-										
10]		Ā										
	RS-3	60	10-15		13	-	\bowtie		Poorly G	raded Sand, (SP) gra	y, wet					
11				-		-	\bowtie									
12							\bowtie			•						
					_				Dendy C	Preded Cond. (CD) DO	0/ 7	·0 0/		. h		
13					1_	+	\bowtie		gravel of	raded Sand, (SP) 20 ' oserved.	% graver, ≀	u % sar	ia, dari	C Drown Diack, w	et, trace fine	'
14							\bowtie									
							\bowtie									
15	RS-4	60	15-20	-	1	4	\bowtie		Poorly G	Graded Sand, (SP) 20	% oravel. 7	0 % sar	nd, darl	k brown black, w	vet	1
16	110 1		10 20	<u> </u>		1	\bowtie			,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	,, g, ,	. ,,	,			
]	\bowtie									
17	-		-			+	\bowtie									ĺ
18]		1										
19									Silty Sar visible in	nd, (SM) 60 % fines, o dication of NAPL	live brown,	wet, No	signs	of stratification of	observed. No	,
20																
			TIFICATION	N RI	EMAR	KS:										
. (3 - Ge S - Spl J - Und R - Col	it Spo distur	on bed Sampl	le									*			

) [7				,			PF	ROJECT	•		1					
Ì		7	rej			₹	:	<u>.</u>	Ny	anza Su	perfund S	ite OU2		Bound	Location	on: <u>See P</u>	lan		
						=		_			Massach		· · · · · · · · · · · · · · · · · · ·	Check	red by:		J. Brur	elle	
7	V۸	his l	Engine	erin	a In	_		_						Date \$	Start: _	October	15, 200	9	
Ľ	-				g, <i>111</i>	<u> </u>		N	lobis File I	No:	8002	2.07		Date l	Finish: _	· Octobe	r 15, 200	9	
			Bo		year		_ F	₹ig	Type / Mo	del:	BLY M	lini-Sonic		Groun	d Surfa	ce Elev.:			
			<u>K.</u>				- 1			:		/A		Тор-о	f-Riser l	Elev.:			
No	obis	Rep.:						lam	mer Holst	i:	N	/A		Datun	າ:		NGVD		<u>. </u>
<u> </u>			Drilling			Samp			Date	Time	Depth Below		undwater (. Rattom of	F Unio /#)	Ctobilization	- Ti
\vdash	pe		Mini-	Sonic	 	Poly E	Bag	 -	₹ 246	11110	10) Deptil of Oa	ionig (ic)	Depur	o Bollom o	i noie (it.)	Stabilizatio	I I IIIIE
Si	Z8			4	_														
Ad	lvan	cemen	So	nic															
(£)	-	SAME	LE.INFORM	ATION	-	p s		STF	RATUM				SAMPLE D	ESCRIP	TION				SX.
Deoth (ft.)		ype Re No. (in		Blows/ 6 in.	PID	Ground Water	Log		Elev./ Desc.				As Modifie	ed by No	bis)	:			REMARKS
	_	S-5 2	20-25	-	1	-			·	Silty San	d, (SM) 30 °	% fines, oli	ve brown, p	oor rec	overy. E	Bag contai	ined mos	tly water.	
2	1	\dashv		-				:	•		,				•		į		
22	2]					-										
23	,			-		┨											,		
	, [1													
24	1																		
25	5			-		1													
	R	S-6 3	25-29.8	3]				Poorly G	raded Sand evidence of	With Grav	el, (SP) 18	inches	of sand	and grave	el . No vi	sual or	
26	3			-		1				Unaciony	evidence of	NAFLIIO	eu.						
27	<u>, </u>			_]				Silty San	id With Grav	rel, (SM) Ti	ill. No visua	l or olfa	ctory ev	idence of	NAPL n	oted.	
28	<u>,</u> -			_		-													
<u> </u>						1		3		No visua	I or olfactory	evidence	of NAPL no	oted.					
29)]													
30	\vdash	 		-		1	\bigotimes	2											
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31	+	_		-	-	1								. *					
32	2												•						
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40		DI E IDI	NTIFICATIO)N -	ENTE	<u> </u>	<u></u>								·				
	G -	Geopre	be	~~ K	EMAR	NO:													
	U-	Split S Undist Core F	irbed Samp	ole															